CLAIMS

1. A method of selecting a light-sensitive compound for application to a substrate and subsequent detection on the substrate comprising:

irradiating the substrate with light;

sensing an emission spectrum of the substrate in response to the irradiation;

determining at least one peak wavelength of light within the emission spectrum; and

selecting a light-sensitive compound that emits or absorbs light at a first wavelength in response to the irradiating light, wherein the first wavelength is different from the at least one peak wavelength.

2. The method of claim 1 further comprising selecting a second light-sensitive compound that emits or absorbs light at a second wavelength in response to the irradiating light, wherein the second wavelength is different from the at least one peak wavelength and is different from the first wavelength.

3. The method of claim 1 wherein irradiating the substrate with light comprises irradiating the substrate with light having a first irradiating wavelength of light and a second irradiating wavelength of light.

4. The method of claim 3 further comprising:

selecting a first light-sensitive compound that emits or absorbs light at a first wavelength in response to first irradiating wavelength of light; and

selecting a second light-emissive compound that emits or absorbs light at a second wavelength in response to second irradiating wavelength of light.

5. The method of claim 1 in combination with applying the selected light-sensitive compound to the substrate.

6. The method of claim 5 in combination with detecting the presence of the selected light-sensitive compound on the substrate.

7. The method of claim 4 in combination with applying the first and the second light-sensitive compounds to the substrate.

8. The method of claim 7 in combination with detecting the presence of the first and the second light-sensitive compounds on the substrate.

9. The method of claim 8 further comprising determining the ratio of the intensities of the first and second wavelengths of light.

10. The method of claim 5 further comprising

irradiating the substrate with light;

sensing light emission or absorption at the first wavelength in response to the irradiating light; and

determining whether the first wavelength is different from the at least one peak wavelength.

11. The method of claim 10 further comprising selecting another light-sensitive compound if the first wavelength is not different from the at least one peak wavelength to compensate for any interaction between the substrate and the light-sensitive compound.

12. A detection device for detecting a mark on a substrate, the mark including a light-sensitive compound that emits or absorbs light at a first wavelength, the device comprising:

a video mode comprising:

a detector for detecting an image of at least a portion of the substrate known to include the mark; and

a video display for viewing the image; and

a snapshot mode comprising:

a light for irradiating the substrate;

a detector for detecting light emission or absorption of the light-sensitive compound in the mark; and

a snapshot display for displaying data representative of the detected emission or absorption of the light-sensitive compound in the mark, thereby capturing the mark on the

image of the portion of the substrate.

13. The device of claim 12 further comprising a storage medium for storing the data representative of the detected emission or absorption of the light-sensitive compound in the mark.

14. The device of claim 13 wherein the storage medium comprises a storage medium capable of storing the data in a digital format.

15. The device of claim 13 wherein the storage medium comprises film.

16. The device of claim 13 further comprising at least one of a date and time stamp stored in the storage medium, the at least one of the date and time stamp representing a corresponding at least one of a date and time stamp when the device captured the mark.

17. The device of claim 12 wherein the light comprises a flash.

18. The device of claim 12 further comprising a filter operably coupled to the light to allow light of at least one predetermined wavelength to irradiate the mark.

19. The device of claim 18 wherein the filter is interchangeable such that a filter may be selected based upon the light-sensitive compound within the mark.

20. The device of claim 12 further comprising a touch screen for inputting commands to the device.

21. The device of claim 12 further comprising a display having at least a portion thereof that includes a split screen, with the video display comprising a first half of the split screen and with the snapshot display comprising the second half of the split screen.

22. The device of claim 12 wherein a predetermined color representing the mark is displayed on the display.

23. The device of claim 12 wherein the device first displays the image when in video mode, displays the mark when in the snapshot mode, then returns to display the image when in the video mode.

24. An authentication mark for determining whether a product or a product package is authentic, comprising:

a visible mark selected from the group consisting of trademarks, product names, company names and logos, the mark being applied on at least a portion of the product or product package; and

an invisible mark applied on the product or product package and intersecting at least a portion of the visible mark.

25. The authentication mark of claim 24 wherein the invisible authentication mark comprises a light sensitive compound that emits in the UV or IR range in response to excitation at a wavelength.

26. The authentication mark of claim 25 further comprising a second light sensitive compound that emits in the visible, UV or IR range in response to excitation at the wavelength.

27. The authentication mark of claim 25 further comprising a second light sensitive compound that emits in the visible, UV or IR range in response to excitation at a second wavelength.

28. The authentication mark of claim 27 wherein the mark is authenticated by comparing the ratio of the emission levels of at least two light sensitive compounds to a standard ratio.

29. The authentication mark of claim 25 wherein the invisible mark is applied over the visible mark.

30. The authentication mark of claim 25 wherein the visible mark is applied over the invisible mark.

31. The authentication mark of claim 25 wherein the visible mark is applied with the invisible mark.

32. An authentication system comprising:

an authentication device capable of ratiometrically analyzing the emission of light from an image of at least two discreet wavelengths;

a substrate having a compound emitting at a first wavelength in response to excitation by a light source of a specific wavelength and a compound emitting at the second wavelength in response to excitation by a light source of a specific wavelength; and

a printer.

33. The system of claim 32 wherein the printer is an inkjet printer.

34. The system of claim 32 wherein the authentication device includes a light source.

35. The system of claim 34 wherein the light source is filtered.

36. The system of claim 32 wherein the authentication device is handheld.

37. The system of claim 32 wherein the ink is a water insoluble ink.

38. The system of claim 32 wherein the substrate is at least about six inches away from the first detector.

39. The system of claim 38 wherein the substrate is at least about 6 feet away from the first detector.

40. The system of claim 32 wherein the substrate is a product package.

41. The system of claim 32 wherein at least one of the first and second wavelength is not visible.

42. A method of resolving an image comprising:

simultaneously detecting a first wavelength with a first detector and a second wavelength with a second detector;

determining a first threshold intensity for the first wavelength and a second threshold intensity for the second wavelength;

dividing pixels on the first detector into those exceeding the first intensity threshold and those falling below the first intensity threshold;

dividing pixels on the second detector into those exceeding the second intensity threshold and those falling below the second intensity threshold;

determining a group of pixels that exceed the first intensity threshold as well as exceed the second intensity threshold; and

calculating a first ratio of the intensity of the first wavelength detected to the second wavelength detected for pixels within the group.

43. The method of claim 42 further comprising comparing the first ratio with a second ratio.

44. The method of claim 43 further comprising determining if the first ratio is within an error amount of the second ratio.

45. The method of claim 44 further comprising displaying an image of the pixels for which the first ratio differs from the second ratio by less than or equal the error amount.

46. The method of claim 45 wherein the image of the pixels is displayed in a color.

47. The method of claim 44 wherein the error amount is plus or minus 10 percent.

48. The method of claim 44 further comprising displaying an image of the pixels for which the first ratio differs from the second ratio by greater than the error amount.

49. The method of claim 48 wherein the image of the pixels is displayed in a color.

50. The method of claim 44 further comprising indicating that the image is genuine.

51. A method of authentication comprising:

producing an ink containing a first compound that emits light at a first discreet wavelength and a second compound that emits light at a second discreet wavelength;

printing a readable image on a substrate with the ink;

detecting a ratio of the first compound to the second compound on the substrate;

indicating whether the ratio is within a range; and

reading the image.

52. The method of claim 51 wherein the first discreet wavelength is visible and the second discreet wavelength is in a UV range.

53. The method of claim 51 wherein the image is selected from a group consisting of letters, numbers, logos and bar codes.

54. A water insoluble ink comprising:

a solvent;

a first light sensitive compound having an emission wavelength in one of the visible and non-visible ranges wherein the light sensitive compound is electrostatically dispersed in the solvent; and

a second light sensitive compound.

55. The water insoluble ink of claim 54 wherein the first light sensitive compound emits in the visible range in response to an excitation wavelength and the second light sensitive compound emits in the infrared range in response to the excitation wavelength.

56. The water insoluble ink of claim 54 wherein at least one of the first light sensitive compound and the second light sensitive compound has been filtered to remove particles greater than about 2.0 microns.

57. The water insoluble ink of claim 54 wherein the solvent is a ketone.

58. The water insoluble ink of claim 57 wherein the solvent is MEK.

59. The water insoluble ink of claim 54 further comprising a binder.

60. The water insoluble ink of claim 54 further comprising a humectant.

61. The water insoluble ink of claim 54 further comprising a lower alcohol.

62. The water insoluble ink of claim 54 further comprising a corrosion inhibitor.

63. The water insoluble ink of claim 54 further comprising a biocide.

64. The water insoluble ink of claim 54 wherein the first light sensitive compound is selected from the group consisting of inorganic pigments, organic dyes, photochromic dyes and fluorophoric compounds.

65. The water insoluble ink of claim 54 wherein the first light sensitive compound is a photochromic dye encapsulated in a polymer or a photochromic dye cross-linked with a polymer.

66. The water insoluble ink of claim 54 wherein the first light sensitive compound is selected from the group consisting of phthalocyanines, naphthalocyanines and squarines.

67. The water insoluble ink of claim 55 wherein the first light sensitive compound emits in response to a black light.

68. The water insoluble ink of claim 54 wherein the second light sensitive compound is electrostatically dispersed in the solvent.

69. The water insoluble ink of claim 54 wherein the ink is printable using a continuous ink jet printer.

70. A method of conveying information comprising:

printing an image on a substrate with an ink wherein the ink includes a first compound emitting in a visible range and a second compound emitting in an IR range;

irradiating the substrate with light of a wavelength capable of exciting at least one of the first compound and the second compound;

detecting the light emitted in response to irradiating;

determining a ratio of the emission of the first compound to the emission of the second compound;

comparing the ratio with a standard; and

displaying the image.

71. The method of claim 70 wherein the image is displayed in human readable form.

72. The method of claim 70 wherein the image is displayed in machine readable form.

73. The method of claim 70 further comprising verifying that the irradiating wavelength is an expected irradiating wavelength.

74. The method of claim 70 further comprising verifying that the light emitted in response to irradiating is at an expected wavelength.

75. A detection device for detecting a mark on a substrate, the mark including a light-sensitive compound that emits or absorbs light at a first wavelength, the device comprising:

a light source for irradiating the light-sensitive compound; and

a filter for filtering undesired wavelengths of light from irradiating the light-sensitive compound.

76. The device of claim 75 wherein the filter is interchangeable such that a filter may be selected based upon the light-sensitive compound within the mark.

77. The device of claim 75 further comprising a plurality of filters, each interchangeable with each other such that a filter may be selected based upon the light-sensitive compound

within the mark.

78. A detection device for detecting a mark on a substrate, the mark including a light-sensitive compound that emits or absorbs light at a first wavelength, the device comprising:

a light for irradiating the substrate;

a detector for detecting light emission or absorption of the light-sensitive compound in the mark;

a display for viewing the mark; and

a touch screen for inputting commands to the device.

79. The device of claim 78 wherein the touch screen includes the display.

80. The device of claim 78 wherein the display includes at least a portion thereof that includes a split screen.

81. A detection device for detecting a mark on a substrate, the mark including a light-sensitive compound that emits or absorbs light at a first wavelength, the device comprising:

a light for irradiating the substrate;

a detector for detecting light emission or absorption of the light-sensitive compound in the mark;

a display for viewing the mark; and

a processor for processing detected light emission or absorption and displaying the light emission or absorption on the display in a predetermined color.

82. A detection device for detecting a mark on a substrate, the mark including a light-sensitive compound that emits or absorbs light at a first wavelength, the device comprising:

a light source for irradiating the substrate with a flash of light having a predetermined wavelength of light suitable for irradiating the light-sensitive compound;

a detector for detecting light emission or absorption of the light-sensitive compound in the mark; and

a display for viewing the mark.

83. The water soluble ink of claim 54 wherein the second light sensitive compound has an emission wavelength in the UV range.

84. The water soluble ink of claim 54 wherein the second light sensitive compound has an emission wavelength in the visible range.

85. The water soluble ink of claim 54 wherein the second light sensitive compound has an emission wavelength in the IR range.